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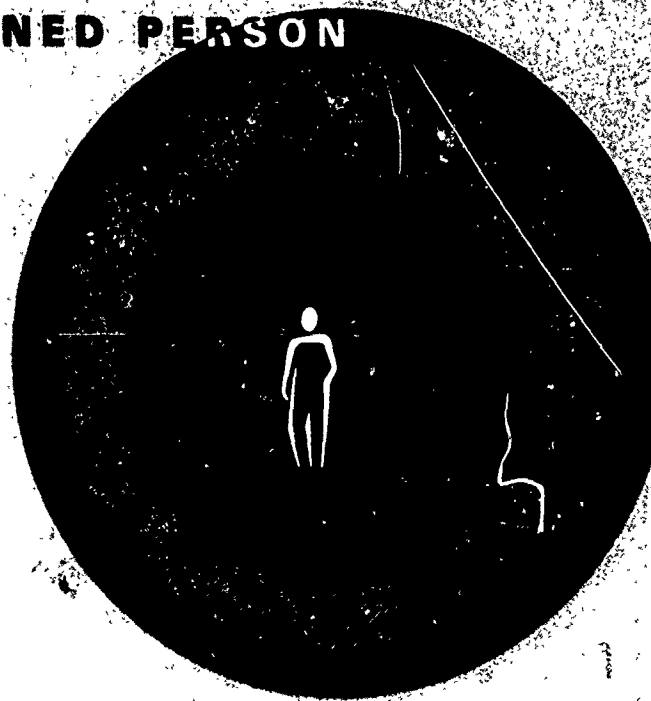
**ASSESSMENT OF SURFACE NAVY
ECGM TRAINING, 1975 TO 1980**

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TRAINING ANALYSIS AND EVALUATION GROUP
ORLANDO, FLORIDA 32813

TAEG Report No. 93

ASSESSMENT OF SURFACE NAVY ECCM TRAINING, 1975 TO 1980

Ted E. Pearson
Willard B. Stubbs

Training Analysis and Evaluation Group

December 1980

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derived that paralleled the previous study approach in order to maintain consistency between the two analyses. The present report contains a summary of TAEG-15 so that the reader will have a foundation for examining the data presented in the body of this report.

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SECTION I

INTRODUCTION

In 1972 the Fleet Electronic Warfare Support Group (FEWSG) prepared reports concerning surface Navy Electronic Counter-Countermeasures (ECCM) operational exercises. The exercises indicated an inadequate state of ECCM readiness. Efforts to improve the ECCM situation reported by FEWSG led the Chief of Naval Education and Training (CNET) in June 1974 to task the Training Analysis and Evaluation Group (TAEG) to conduct an analysis of surface Navy ECCM training. In April 1975, TAEG published the results of the ECCM analysis.¹

The resulting TAEG study (hereafter referred to as TAEG-15) identified and analyzed the processes and doctrine through which the surface Navy trains and utilizes personnel that operate radar equipment having ECCM capabilities. Problems and deficiencies in ECCM training were examined; near- and long-term solutions were developed. Appendix A presents a substantive summary of that study.

In the 5 years since publication of TAEG-15 the state of surface Navy ECCM readiness has continued to be of concern. Expressions of this concern by Chief of Naval Operations and fleet representatives at Consolidated Navy Electronic Warfare Training Plan conferences led to a request by CNET that TAEG update the original ECCM report.

PURPOSE

The purpose of this report is to update TAEG-15 to include:

- the current status of surface Navy ECCM training
- training devices and aids
- fleet ECCM readiness
- recommendations for improving ECCM readiness.

APPROACH

The initial step in the conduct of the analysis discussed herein was a review of the procedures used and data base derived during the TAEG-15 study. A study approach was then derived that paralleled the previous study approach in order to maintain consistency between the two analyses. The following was accomplished:

- The processes and doctrine through which the surface Navy identifies, trains and utilizes personnel who operate ECCM capable radar equipment were analyzed.

¹T. E. Pearson and W. B. Stubbs. Surface Navy ECCM Training Analysis. TAEG Report No. 15. April 1975. Training Analysis and Evaluation Group, Orlando, FL 32813 (AD B008049)

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- Performance (behaviors) required of surface Navy ECCM radar operator personnel were examined.
- Navy schools' curricula were screened to identify changes which may have occurred during the past 5 years.
- Interviews were held with ECCM knowledgeable surface Navy personnel.
- Counterpart Air Force schools' ECCM curricula were examined to determine the extent of commonality of subject material, time allocated to each subject, training course effectiveness, and personnel utilization policies.
- Navy FEWSG exercise reports were analyzed to determine established policies and procedures and the effectiveness of training. At FEWSG headquarters, TAEG reviewed a total of 121 fleet exercise reports covering the period 1975 to 1980.

ORGANIZATION OF THE REPORT

In addition to this introduction, the report contains two other sections. Section II presents the study findings. Section III presents the conclusion and recommendations resulting from the study. In addition, supplemental information is provided in three appendices. Appendix A presents a summary of the TAEG-15 report in order to provide the reader with a foundation for examining the data presented in the body of this report. Appendix B provides a composite of the Navy's formal surface Navy ECCM courses. Considerable information is presented on various aspects of ECCM training. Appendix C provides a listing of the FEWSG exercise reports examined by the TAEG.

SECTION II

FINDINGS

This section presents detailed information and data concerning the characteristics of ECCM in the surface Navy and surface ship radar operator ECCM tasks, policies and procedures concerning ECCM, and fleet training exercises. In addition, formal and fleet ECCM schools and the training aids and devices employed are examined; Air Force and Navy ECCM courses are compared.

ECCM IN THE SURFACE NAVY

The characteristics of ECCM in the surface Navy have remained consistent over time. It is applied primarily to Anti-Air Warfare (AAW) and Anti-Ship Missile Defense (ASMD) radar systems. The hardware or ECCM circuitry itself is supplementary to the prime hardware and circuitry of the associated system. Employment of the ECCM feature(s) provides one or more of the following benefits:

- prevention of receiver saturation
- constant false alarm rate (CFAR)
- directional interference discrimination
- signal-to-jamming ratio enhancement.

Fleet awareness of ECCM importance was found to have improved over its "second cousin" image reported in 1975. However, infrequent participation in Pierside training and/or fleet exercises, where operators can practice their ECCM skills, continues to have an adverse impact on readiness.

SURFACE NAVY RADAR OPERATOR ECCM TASKS

The principal skill and knowledge requirements of the radar operator remain:

- know the types and characteristics of anticipated Electronic Countermeasures (ECM)
- detect and identify ECM via the radar system
- know the effect of ECM techniques on radar system performance
- know ECCM options, in level of effectiveness order, for countering detected ECM
- know the ECCM capabilities and limitations of the radar system(s) assigned
- locate and activate ECCM techniques associated with the radar system(s)

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- where applicable, control/adjust activated ECCM techniques that can be varied to optimize radar data fidelity
- know the current ECCM tactical doctrine.

Initiatives exist within the Navy material acquisition process to develop automated ECCM systems for selected present and future radar systems. If further defined and implemented, the skill and knowledge requirements for the operator could change significantly. In fact, the ECCM tasks of the operator could shift to those of an analyst of processed data, as has been the case with other surface combat system operators where automated equipments are employed. This occurrence is unlikely in the near future.

NAVY ECCM POLICIES AND PROCEDURES

TAEG-15 reported that well delineated policies and procedures existed throughout the surface Navy structure. It was also reported that, where related to training, failure to effectively implement policy and/or procedures contributed to a lack of ECCM readiness (see appendix A). Presently, that situation has changed. Emphasis on expanded resources for both in-port and underway ECM/ECCM training assets (to be discussed subsequently) is evidence of an improved attitude. This attitude change can in part be attributed to the heightened awareness for improved coordination of all warfare functions within the surface combatants.

SURFACE NAVY ECCM RELATED TRAINING PIPELINE (CNET) SCHOOLS

Substantially no change in either Operations Specialist (OS) "A" School or the Fire Control Technician (FT) School has occurred during the 1975 to 1980 time period. In essence, there is only a token effort to provide meaningful ECCM training.

FLEET LEVEL SCHOOLS

Table 1 presents a summary of surface Navy ECCM training available through fleet level schools. Appendix B contains a detailed description of each course and other pertinent data extracted from the Catalogue of Navy Training Courses (CANTRAC). As shown in table 1, there are only three courses "dedicated" to ECCM training: K-221-0083, J-221-0303, and J-221-0304. The other courses present from 7 to 75 percent of ECCM subject matter. A review of the course outline indicates that in subject matter content and length of course, the three "dedicated" ECCM courses are essentially the same. This is exactly the situation as reported in 1975. Further discussion is presented in a subsequent topic in this section of the report.

ECCM TRAINING DEVICES

In the 1975 time frame, the following four training devices were capable of providing surface Navy radar ECCM training:

- Device 15E13/15E28--A component of the Tactical Advanced Combat Direction and Electronic Warfare (TACDEW) Training Complexes, Fleet Combat Training Centers, San Diego, CA, and Dam Neck, VA.

TABLE 1. SUMMARY OF NAVY FLEET ECCM RELATED COURSES

| COURSE NO./LOCATION | COURSE TITLE | THEORY HOURS | LAB HOURS | TOTAL HOURS | FY-79 GRADS | COURSE LENGTH (DAYS) | CONVENING FREQUENCY | COMMENTS |
|---|---|----------------------|----------------------|----------------------|----------------------|----------------------|------------------------------------|--|
| J-26-0325 COMBATRACENPAC COMBATRACENLANT | CIC OFFICER INTERMEDIATE, MODULE II | 66 71 | 36 55 | 102 126 | 129 141 | 19 19 | 7/yr 12/yr | ECCM only <u>ONE</u> of <u>NINE</u> subjects in course |
| K-221-0071 COMBATRACEN PAC FLETRAGRU WPAC FLETRAGRU PEARL | CIC WATCH SUPERVISOR | 95 80 107 | 31 0 0 | 126 80 107 | 216 18 14 | 19 10 19 | Various Various Various | ECCM only <u>ONE</u> of <u>FOURTEEN</u> subjects in course No Lab Time Indicated |
| K-221-0083 COMBATRACENPAC | CIC SEARCH RADAR JAMMING, RECOGNITION AND COUNTERMEASURES | 21 | 21 | 42 | 123 | 5 | 9/yr | Course entirely devoted to ECCM/ECCM |
| J-221-0303 COMBATRACENLANT FTC MAYPORT FTC SAN DIEGO | SEARCH RADAR OPERATORS JAMMING RECOGNITION AND COUNTERMEASURES | 24 25 | 10 17 | 34 42 | 18 34 | 5 5 | ? ? | Course entirely devoted to ECCM/ECCM |
| J-221-0304 FLEINWARTRACEN (FAMMTC) CHASN | SEARCH RADAR OPERATORS JAMMING RECOGNITION AND COUNTERMEASURES | 35 | 0 | 35 | 22 | 5 | 6/yr | Course entirely devoted to ECCM/ECCM No Lab Time Indicated |
| J-221-0320 MISTRAULANT | SHIPBOARD INTEGRATED WPNS, CIC, EW, TRAINING COURSE | Not listed in NITRAS | | | | | | |
| J-221-0338 COMBATRACENLANT | CIC AIR SEARCH RADAR OPERATIONS, JAMMING RECOGNITION | 34 | 35 | 69 | 76 | 12 | 11/yr | Approx. 75% of course relates to ECCM/ECCM Approx. 25% of course relates to MK12 IFF/UFA-59 |
| J-233-0202 FTC NORVA FLETRAGRU PEARL FTC MAYPORT FAMMTC CHASN | ELECTRONIC WARFARE OPERATOR COURSE, INTERMEDIATE | 23 17 23 24 | 17 15 19 12 | 40 32 42 36 | 64 17 28 21 | 5 5 5 5 | Monthly 6/yr 6/yr Monthly | ECCM/ECCM only <u>ONE</u> of <u>EIGHT</u> subjects in course |

SOURCE: NITRAS (7/9/80)/CANTRAC DATA

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- Device 15E15--A portable target and ECM generation system that can stimulate operational radar systems.
- Device AN/SPH-1 RAVIR--A video playback system used for indoctrination for surface search radar operations.
- MPQ-T1 Pierside Trainer--A mobile van capable of stimulating multiple sensors aboard surface ships.

A new series pierside Mobile Integrated Systems Trainer, Evaluator and Recorder (MISTER) was reported underdevelopment in TAEG-15, but this effort was terminated in 1977.

In addition to the four trainers listed above, three new ECCM-capable devices are currently underdevelopment. These are the Device 20B4, the Mobile Combat Systems Trainer; Device 20B5, the Perry Class Pierside Combat Systems Trainer; and a Micro Processor-based portable system for remote site training.

Device 20B4 is an outgrowth of the earlier MPQ-T1 pierside training program and uses current technology to provide a more capable stimulation/evaluation system for CIC, AAW, and Electronic Warfare (EW) training. A total of four units are under procurement, one of which has been delivered. The delivered unit is under the cognizance of the Fleet Training Unit, Little Creek, VA.

Device 20B5 is the next evolution in the MPQ-T1/20B4-type pierside trainers. The initial 20B5's will be capable of providing tactical training exercises for combat information center and sonar room personnel onboard USS Perry Class (FFG7) ships. Training will consist of AAW, Anti-Submarine Warfare (ASW), Surface Warfare, and EW operations scenarios. While generally providing a more comprehensive simulation than the 20B4, the area of major difference is the added sonar simulation capabilities of the 20B5. A potential for stimulating up to six ships of varying classes is a growth potential envisioned for this trainer.

In 1975 TAEG recommended that the Navy Personnel Research and Development Center (NAVPERSRANDCEN) initiate ECCM training research in recognition skills and knowledge training oriented to specific platforms (see appendix A). NAVPERSRANDCEN responded with a program (Z1177-PNG1) to develop and evaluate computer-based training for school and remote site training of fleet radar operators. The prototype trainer emerging from this program possesses interactive computer assisted instruction of lessons in (1) radar specific ECM recognition and ECCM Techniques Training, (2) drill and practice in ECCM vs. ECM, (3) acquisition of critical knowledge of ECCM basic concepts using computer graphics, and (4) ECCM vs. ECM performance testing. The prototype training is currently being evaluated in fleet training facilities by NAVPERSRANDCEN. Results of testing to date were not available at the writing of this report.

ECCM TRAINING AIDS

In the same 1975 period, two categories of ECCM training aids were identified: publications and audio/visual programs. In the category of

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publications, the Surface Missile System (SMS), TG-670 series documents, Radar Operations in Electronic Countermeasures, remain the best available source of material. Their major drawback is that the level of technical detail is most appropriate for FTs. The OSs will find difficulty with the more technical portions of the documents since they have not had in-depth training in radar systems theory.

In 1975 the Naval Ship Missile System/Engineering Station² (NSMSES) maintained a series of audio/visual training materials specifically developed for surface Navy radar operator ECCM training. As of the writing of this report, the status of these programs is in doubt. Due to a lack of use over the years and a need for update with no funding sponsor, the programs will probably be removed from inventory. Replacement programs could not be located.

FLEET TRAINING EXERCISES

The TAEK examined 121 FEWSG EW training exercise reports covering the period 1975 to March 1980 (see appendix C). Twenty-nine of the reports were Naval aviation EW exercises.

The analyses of these 121 surface Navy reports duplicate the findings of the 1975 study; namely:

- Lack of continuity in data and reporting format, from ship to ship, makes it impossible to do a meaningful ECM/ECCM statistical analysis.
- ECCM technique employment appeared to occur on a trial-and-error basis. (Lack of ECM recognition/correct (ECCM) response training is apparent.)
- Many cases existed where ECCM was used as a technically "wrong" technique and reported to have "improved" target track or "eliminated" the effects of ECM.
- Reports of "Raw" (no ECCM) video cleaning up ECM.

Again, the most positive benefit derived by exercise participants appears to have been the exposure of the radar operators and other CIC personnel to an EW environment in an operational setting. In this regard, the awareness of ECCM options (tactical decisions) is improving apparently due to a more frequent exposure to FEWSG assets.

COMPARISON OF SURFACE NAVY AND AIR FORCE ECCM TRAINING

In 1975 TAEK compared Navy ECCM courses of instruction with Air Force course E30LR1741D 002 which possessed comparable training objectives. Currently three Navy courses (K-221-0083, J-221-0303 and J-221-0304) are dedicated to ECCM. These courses present essentially the same subject

²This is now the Ship Weapon Systems Engineering Station (NAVSHIPWPNSYSENGSTA).

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matter. TAEG selected Navy course K-221-0083 to provide a current comparison with the Air Force course. Table 2 compares the current curriculum outlines for the Navy and Air Force courses as they exist today in 1980.

The course outlines/plan of instruction describe each course as follows:

NAVY COURSE K-221-0083

COURSE MISSION: To provide an introduction to electronic countermeasures and procedures used to counter various types of jamming. Additionally, the capabilities, limitations and potentials of specific radars will be presented to enhance their effectiveness when used in a combat/exercise environment.

AIR FORCE COURSE E30LR1741D 002

COURSE DESIGN/DESCRIPTION: The instructional design for this course is Group/Lock Step. This course provides lateral career training for weapons controllers (AFSC 174X). It includes training in the basic application of radar principles, data flow in typical radar sets, data processing equipment, comprehensive theory of Electronic Countermeasures (ECM) and Electronic Counter Countermeasures (ECCM), and operations as a Radar Inputs and Countermeasures Officer (RICMO) and Anti-Jamming Officer (AJO).

As in 1975, there is still a better than 10 to 1 ratio in terms of overall course length with a total of 313 hours for the Air Force course, spanning 12 weeks as opposed to 26.4 hours for the Navy course spanning 5 days.

Perhaps the biggest change noted between these two courses is in the area of reference material and audio/visual aids. Tables 3 and 4 list the supporting training resources for the respective Navy and Air Force courses. The Air Force course has a much more comprehensive set of supporting materials, particularly in the audio/visual area. While not listed, the Navy course has locally developed visual aids in addition to the 17SS series of slide sound programs listed in table 3. It should be noted that the 17SS series programs used in the Navy course are the NSMES programs previously discussed in this section of the report. They are excellent materials but need updating.

The Air Force course continues to have the use of an ECM simulation device, AN/GPA-98, which is interfaced with an operational radar system and provides hands on ECM/ECCM training via simulated ECM and Target environment generation. The Navy course still lacks a similar capability not only at the formal schools level, but also at an operational (shipboard) level.

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TABLE 2. COURSE TIME/UNIT COMPARISON

| USAF E30LR1741D 002 | | | | USN K-221-0083 | |
|---------------------|--|--------------|-------------|---|--------------|
| <u>BLOCK</u> | <u>TITLE</u> | <u>HOURS</u> | <u>UNIT</u> | <u>TITLE</u> | <u>HOURS</u> |
| I | COURSE INTRODUCTION | 2 | 1 | WELCOME ABOARD AND ORIENTATION | 1 |
| | RADAR FUNDAMENTALS TRANSMITTED SYSTEMS | 46 | 2 | ECM AND ECCM RADAR CONTROLS | |
| | RECEIVER SYSTEMS | 22 | | | |
| | INTERFERENCE REDUCTION SYSTEMS | 8 | 2.1 | PRINCIPLES OF RADAR | 3 |
| | ELECTRONIC DISPLAYS | 8 | 2.2 | PRINCIPLES OF ELECTRONIC COUNTER MEASURES | 3 |
| | ANTENNA CHARACTERISTICS | 8 | | | |
| | EFFECTS OF WEATHER ON RADAR | 6 | 2.3 | AN/SPS-40 RADAR ECCM FEATURES | 1.8 |
| | | | | | |
| II | ELECTRONIC WARFARE | | 2.4 | AN/SPS-43 RADAR ECCM FEATURES | 1.8 |
| | ELECTRONIC WARFARE POLICY | 2 | | | |
| | ELECTRONIC SUPPORT MEASURES | 6 | 2.5 | AN/SPS-10 RADAR ECCM FEATURES | 1.8 |
| | ELECTRONIC COUNTER MEASURES | 28 | 2.6 | AN/SPS-48 RADAR ECCM FEATURES | 4 |
| | FOREIGN THREAT | 16 | 2.7 | ECM and MIJI REPORTING | 1.5 |
| | ELECTRONIC COUNTER COUNTERMEASURES | 10 | 2.8 | ESM/INTRA-SHIP | .5 |
| III | AIR DEFENSE RADARS | 30 | 3 | PRACTICAL | 6 |
| IV | SAGE | 61 | 4 | EXAMINATION AND REVIEW | 2 |
| V | TACTICAL SYSTEMS OPERATIONS | 60 | | | |
| | COURSE LENGTH | 313 | | COURSE LENGTH | 26.4 |

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TABLE 3. USN K-221-0083 COURSE SUPPORT MATERIALS

I. TEXT MATERIALS

MILITARY PUBLICATION
NUMBER (MILPUBS)

COMPLETE TITLE

| | |
|----------------------------|--|
| NAVEDTRA 10144C | Operations Specialist 3&2 |
| NAVEDTRA 10147E | Operations Specialist 1&C |
| NWP-32 (series) | Anti-Air Warfare |
| NWP-33 (series) | Electronic Warfare |
| OPNAVINST 3430.18 (series) | MIJI Reporting Procedures |
| SMS-TG-670-01 | Introduction to Operational Techniques |
| SMS-TG-670-23 | AN/SPS-40 Search Radar Operation in ECCM |
| SMS-TG-670-24 | AN/SPS-43 Search Radar Operation in ECCM |
| SMS-TG-670-20 | AN/SPS-10 Search Radar Operation in ECCM |
| OPNAVINST 5510.1E | Information Security Program |
| OPNAVINST 5510.45B | Physical Security Manual |

II. TRAINING AIDS

A. FILMS:

NUMBER

TITLE

| | |
|---------|---|
| MN10238 | Countermeasures and the Surface Missile Ship |
| MN10237 | Radar Set AN/SPS-48 Operation |

B. SLIDE SOUND PRESENTATIONS:

PROGRAM NUMBER

TITLE

| | |
|---------|-----------------------------------|
| 17SS-28 | AN/SPS-43, AN/SPS-43 Presentation |
| 17SS-29 | AN/SPS-40, Presentation |
| 17SS-44 | AN/SPS-48, Unit I |
| 17SS-45 | AN/SPS-48, Unit II |
| 17SS-46 | AN/SPS-48, Unit III |
| 17SS-47 | AN/SPS-48, Unit IV |

TABLE 4. USAF E3OLR1741D 002 COURSE SUPPORT MATERIALS

I. STUDENT INSTRUCTIONAL MATERIALS

ST KAV-1165, The Training Evaluation Feedback System
 ATC SG E3ABR/OBR00001, Communications Security (General Non-technical)
 ST KDA-3005, Operations Security (OPSEC)
 SH KDA-1811, ECM/ECCM Glossary
 ST KDA-1810, Powers of Ten, Metric Prefixes, and Decibel Notations
 SG KDA-1801, Radar Fundamentals and Transmitter Operations
 ST KDA-1824, Pulse Coding and Decoding
 ST KDA-1813, Phase Coding/Decoding
 ST KDA-1815, Radar Receivers
 ST KDA-1805, Receivers and Indicators
 ST KDA-1819, Gain Reduction Techniques
 ST KDA-1821, Interference Reduction Techniques
 WB KDA-1803, Display Diagrams
 ST KDA-1817, Antenna Characteristics
 ST KDA-1822, Effects of Weather on Radar
 SHO KDA-1804, ESM, ECM, ECCM (U)
 AFP 51-3, Electronic Warfare Principles (U)
 SG KDA-1814, Functions and Displays on the AN/GPA-98 ECM Simulator
 SHO KDA-1802, MIJI Format
 AFM 100-31, TAC Sup 1
 TACR 55-3, Vol. 3
 SHO KDA-1820, Radar Diagrams
 KE-E-32-5018, Classified Notebook
 SHO KDA-1806, RICMO/AJO Publications
 ST KDA-1807, AN/FSQ-7 SAGE Computer
 ADCOMR 50-8, Vol. 1, AJO/RICMO Proficiency Training Manual
 ADCOMR 101-2, Data Quality Monitoring/System Operation Monitoring
 TM(ADC) 637/001/002 SAGE Operations Specifications
 ST KDA-1825, The Beacon System
 ADCOMP 50-24, Vol. I, II, Training Pamphlet for AIMS System Users
 SHO KDA-1812, Common Digitizer
 SHO KDA-1826, Common Digitizer (Q47) Figures
 SHO KDA-1816, Random Planned Position Indicator
 SHO KDA-1808, Control of Inputs
 TM(ADC) 637/001/002, SAGE Computer Program Operational Specifications
 HO KDA-1818, Real Time Quality Control
 HO KDA-1809, Active Tracking
 ADCOMR 50-8, Vol. 1, AJO/RICMO Proficiency Training Manual
 TACR 55-44
 TACR 55-45
 ST KDA-1854, Organization, Structure and Equipment of TACS/TADS
 KDA, 1783 TACS Familiarization
 HO KDA-1827, Systems Block Diagrams and Synchronizer
 TACS/TADS Positional Handbook
 IORP/IMPP User's Manual
 E3A System Description (D204-12004-2)
 E3A Mission Crew Training Conversion Course
 TACR 55-3, Vol. III
 TACR 3-5

TABLE 4. USAF E30LR1741D 002 COURSE SUPPORT MATERIALS (continued)

I. STUDENT INSTRUCTIONAL MATERIALS (continued)

Pub Improved E3A Radome
 AWACS DOT&E Surveillance Radar
 CP 204-1602B AWACS IAU Operation and Maintenance IBMS/4Pi
 Model CC 1 Technical Description
 E3A Mission Crew Conversion Course
 SHO KDA Beacon Equipment and Function
 Letter E3A Vs Vassier Kuppe Radar ECM Demo
 Extension of ECM Threat to the E3A Radar
 Letter/Pub "Improved E3A Radome"
 TACR 55-44 Annex A
 TACM 3-1 Vol. 1
 Letter ECCM Capabilities TPS 43 E
 EOT&E Report TPS-43 E
 AWACS DDT&E Report Surveillance Radar
 AFR 55-90, Electronic Warfare Policy
 AFM 100-10, ECCM for C3 Systems
 AFCSR 200-1
 Electronic Warfare reports series, EB, EC, and EH

II. AUDIO/VISUAL AIDS

Film FR 1321, GPSEC and You (12 min)
 Transparency Group, Block I
 Transparency Group, Block IA
 Video Cassette, TVK 30-103 (26 min), Power of Ten
 Video Cassette, TVK 30-8A (24 min), Numbering Systems
 Video Cassette, TVK 30-705 (13 min), Waveform Analysis
 Transparency Group, Block IB
 TF 1-5401A, Antenna Fundamentals (Propagation)
 TF 1-5401B, Antenna Fundamentals (Directivity)
 TF 1-5079A, B, C, Radar Refraction and Weather
 TF 1-5374, (C) Electronic Warfare Part 1 & 2
 TF 1-5390B, (C) ECM Inventory
 TF 1-6053, (U) Reconnaissance in SEA
 TF 1-5390F (C) Sweep Jamming
 TF 1-5390G (C) Barrage Jamming
 TF 1-5390D (C) Mechanical Jamming
 TF 1-5390C (C) Penetration Techniques
 TF 1-5390J (C) Communications Jamming
 TF 1-5390E (C) Spot Jamming
 FR 496 (U) Combating Chaff
 Appropriate Transparencies
 TF 1-5390M, (C) Electronic Warfare in ADC
 Transparency, SAGE Orientation
 Transparency, AN/FSQ-7 SAGE Computer
 Slide Series, AN/FSQ-7 Data Flow
 Slide Series, SAGE Facilities
 Video Cassette, VC3 TS 0774 E3A Strategic Defense (11 min)
 Slide Series, Block IV

TABLE 4. USAF E30LR1741D 002 COURSE SUPPORT MATERIALS (continued)

II. AUDIO/VISUAL AIDS (continued)

Transparency Series, Block IV
 Video Cassette TYK 27-5, Introduction to AIMS
 Transparencies, FYQ-47 Series
 Slide Series, FYQ-47 Series
 Transparencies, Control of Inputs
 Slide Series, RICMO Data Flow and Control of Inputs
 Transparency, RTQC
 Transparency, Active Tracking
 Transparency, Passive Tracking
 Slide Series, RTQC/Active Tracking Program
 Slide Series, Passive Tracking Program
 Transparencies, RICMO/AJO Communications
 Slide Series, RICMO Coordination and Communication
 Transparencies, Block V
 16mm Movie, TF-1-6820, Tactical Air Control System (30 min)
 Transparencies, TPS-43E Radar Systems Diagrams
 35mm Slides, TPS 43E Radar and Display Facilities
 Video Cassette, AVC-3 VTDO 365-725CH ANTPS 43E Radar Set (7 min)
 Transparencies, AN/APY-1 Radar System Diagrams
 35mm Slide, AN/APY-1 Ancillary Equipment
 35mm Slide, AN/APY-1 Radar Antenna
 Video Cassettes:
 E3A on Station (S) (20 min)
 E3A Contingency Employment (Korea) (15 min)
 E3A & Hawk Partnership (15 min)
 16MM Movie:
 Battle of the Northern Flank (S) (15 min)
 Double Edge Sword (C) (30 min)

SECTION III

CONCLUSION AND RECOMMENDATIONS

CONCLUSION

The results of the present study indicate that little forward progress in surface Navy ECCM training has occurred since 1975 (TAEG-15). FEWSG exercise reports corroborate this conclusion. One encouraging note is the continuing evolution of the MPQ T1/20B4/20B5 series Perside Combat System Trainers. Though not the principal driving factor in their development, ECCM training is a capability provided by each. The principal drawback to this progress is the fact that these devices generally provide integrated CIC team training, and there continues to exist a void in the resources needed to provide prerequisite equipment--specific hands-on training at the operator training level. This situation must be rectified since participation in team training exercises by unqualified operators may cause a decrement in operator proficiency of other qualified team performers. While the efforts to develop a microprocessor based remote site ECCM training capability will help close this void,³ it will only rectify a part of the training problem. The major gap continues to be the lack of means to provide system specific operator hands-on training.

RECOMMENDATIONS

As testimony to the continued maintenance of the status quo in Navy ECCM training, the basic recommendations presented in TAEG-15 (April 1975) still pertain. They are as valid today as then except for recommendation 1b for which NPRDC initiated action in 1978.

PRIMARY. Existing organizational structures within OPNAV cognizant of surface Navy ECCM readiness are not considered sufficiently responsive to the current ECCM readiness problem. Training deficiencies, among others, are a result. Accordingly, the primary recommendation of the present study is as follows:

An OPNAV sponsored and supported ECCM training improvement program should be initiated. The four major facets of this program are:

- procurement of small state-of-the-art radar ECM stimulators (see long-term recommendations no. 1 and 2)
- procurement of a small panoramic receiver/indicator such as the Hewlett Packard 8500 series spectrum analyzers, or equivalent, for installation adjacent to each radar set/ECCM control panel/watch supervisor's radar scope
- procurement of a series of video taped radar/ECM signal recognition training programs showing ECCM fix responses and the

³Previously cited NPRDC task (Z1177-PN01)

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effect of each fix on the radar system. A series of these video taped lessons for each major radar system will be required

- well delineated responsibility and authority with strict accountability for all participants.

The program's major objectives should be to initially raise to acceptable standards the operational readiness of the surface Navy ECCM operator/decision-making personnel and to provide mechanisms for maintaining this readiness to required standards. It is further recommended that CNO request the assistance of the Naval Education and Training Command in formulation of this program.

The following near-term and long-term recommendations are made for inclusion in the proposed program, provided that they are initiated as a part of the total program and not separately or independently as a solution to the ECCM readiness program.

RECOMMENDED NEAR-TERM ACTIONS.

1. Initiate the task of precisely defining ECCM personnel performance objectives for the rates within the OS and FT ratings. General guidelines for consideration are:

a. OS and FT "A" School training concentrate on indoctrination in threat ECM techniques, their effect on the families of radar systems within the surface Navy, the ECCM capabilities of the U.S. Naval radar systems to counter ECM, and the characteristics of tactical doctrine employed during hostile ECM encounters.

b. Recognition, skill, and knowledge training should be oriented to the specific platform assigned/to be assigned. Fleet/"C" Schools and/or onboard ships are considered the appropriate settings for this training. Extensive use of shipboard radar ECM stimulators while underway are mandatory for skill and knowledge acquisition and retention.

ACTION: CNO

SUPPORT: CNET, NPRDC, NAVSEASYSOM, FEWSG

2. Develop new or restructure existing curricula in accordance with defined personnel performance objectives. This includes programs for "A" Schools, Fleet/"C" Schools, onboard training, and CIC team training.

ACTION: CNO/CNET

SUPPORT: CNTECHTRA, COMTRALANT/PAC, FEWSG

3. Distribute existing ECCM training assets; i.e., training devices and audio/visual programs, to locations designated to provide ECCM training. Distribution should be in accordance with the ability of training resources to support the training objectives established for the respective locations.

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This part of the program will probably require production of additional sets of existing audio/visual programs. In addition, a concentrated effort will have to be made to bring existing ECCM training devices to fully operational status and maintain them in that status.

ACTION: CNO

SUPPORT: CNET

4. The concept of transferring fleet level ECCM training to a CIC team training setting is not recommended. Personnel must be proficient in their individual tasks/jobs prior to effective participation in team exercises.

ACTION: CNO

SUPPORT: CINCLANT/PAC, COMTRALANT/PAC

5. To the extent feasible, FEWSG assets should be used primarily to provide training to ships possessing radar operator personnel who are graduates of the recommended ECCM training program. To the extent possible, FEWSG ECM/ECCM demonstrations should not be provided to untrained personnel. Cost effective/training effective utilization of assets must be made.

ACTION: CNO, FEWSG

SUPPORT: CINCLANT/PAC

6. Accountability must be incorporated into the proposed ECCM training program. Initially there will probably not be adequate resources; e.g., training aids and devices, to support all of the ECCM training objectives. Therefore, an interim criterion based personnel ECCM job/task certification program(s) should be implemented. Requirements for certification should be commensurate with realizable performance objectives.

ACTION: CNO

SUPPORT: CNET, CINCLANT/PAC

RECOMMENDED LONG-TERM ACTIONS.

1. Identify the ECCM training deficiencies existing after completing the near-term actions. It is considered likely that the major shortfall will be in the number and the capabilities of training devices. This will be particularly true for devices capable of providing equipment specific Fleet/"C" School and/or onboard training.

ACTION: CNO, CNET

SUPPORT: CNTECHTRA, CINCLANT/PAC

2. Initiate programs to procure the required assets and/or make the training program adjustments to remedy deficiencies identified in recommendation 1 above. Onboard training equipments that stimulate the ship's radar

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system appear to be the most viable solution to raising the visibility of ECCM and for providing a mechanism for achieving and maintaining ECCM operator proficiency. Performance training cannot be effectively accomplished in the absence of appropriate ECM (actual or synthetic). In addition, skills associated with ECCM operations are highly perishable, thus requiring frequent use to maintain proficiency. An onboard, underway training capability should be developed to provide training that would interface with and make more meaningful the FEWSG exercises. It is therefore strongly recommended that:

a. Onboard radar stimulation equipments for ECCM training be procured and permanently installed onboard surface combatants. Initial installation should be on the larger capital ships.

b. All new surface Navy AAW/ASMD radar systems should include an inherent capability to completely exercise the systems' ECCM capabilities in support of training and operational readiness. The state-of-the-art in electronics technology makes this integral system capability possible without significant increases in equipment size/weight. Providing the essentials for adequate training without "gold plating" can minimize cost per unit while maximizing fleet ECCM readiness. Training command technical expertise should be combined with material command expertise during the RDT&E phase of new surface radar systems to optimize the training capability features of the equipments.

ACTION: CNO

SUPPORT: CHNAVMAT, CNET

3. Expand the proposed interim ECCM job task certification system as training capability increases until an accountability system is fully instituted that will measure ECCM readiness and identify ships which are not combat ready.

ACTION: CNO

SUPPORT: CNET, CINCLANT/PAC

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APPENDIX A

**Précis of TAEG Report No. 15,
SURFACE NAVY ECCM TRAINING ANALYSIS,
April 1975**

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BACKGROUND

Electronic Warfare (EW) encompasses three disciplines: Electronic Support Measures (ESM), Electronic Countermeasures (ECM), and Electronic Counter-countermeasures (ECCM). Analysis of Naval exercises, highlighted in 1972 by Fleet Electronic Warfare Support Group (FEWSG) reports, indicates that the surface Navy possesses an inadequate ECCM readiness. As a remedy, the Chief of Naval Material (CHNAVMAT) initiated an ECCM improvement program, project U17-64.⁴ Since the CHNAVMAT studies estimated that 45 percent of the surface Navy ECCM problems are training related, the Chief of Naval Education and Training (CNET), in June 1974, tasked the Training Analysis and Evaluation Group (TAEG) to conduct an analysis of surface Navy ECCM training.

STUDY OBJECTIVES

The TAEG study goals were to define the training problems and to formulate a plan for developing an ECCM training system which will improve the ECCM effectiveness of the Naval Ship Combat Systems.

STUDY RATIONALE

The systems approach to planning was used in conducting this study. The initial phase identified and analyzed the current processes and doctrine through which the surface Navy identifies, trains, and utilizes personnel who operate radar equipments which have ECCM capabilities.

The second phase of the analysis examined current problems and deficiencies in the Navy ECCM training system and determined the factors that contribute to those identified.

The final phase of the study was to determine the best strategies for solution of the problem. This was accomplished by developing both short- and long-term solutions to rectify training deficiencies. Factors other than those which can be solved by training, which were found to contribute to a lack of ECCM readiness, are delineated.

FINDINGS

ECCM IN THE SURFACE NAVY. ECCM is a major subdivision of electronic warfare (EW) involving actions taken to insure our own effective use of the electromagnetic spectrum in spite of the enemy's use of ECM. It constitutes the employment of procedures, methods, and equipment technology to counter or protect against enemy use of active or passive ECM. In the surface Navy, ECCM technology is applied principally to the radar systems supporting Anti-Air Warfare (AAW) and Anti-Ship Missile Defense (ASMD). These radar systems perform one or more of the functions of Target Location (Search), Target Acquisition, and Target Tracking.

⁴The CHNAVMAT ECCM Improvement Program, U17-64, was not funded for continuation of work in FY 75.

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ECCM equipments are essentially supplements to primary radar systems, and normal radar operations do not require their use. The requirement for adequate radar system performance during routine operations, coupled with infrequent ECM encounters, has had the adverse effect of relegating the unused ECCM capabilities to an "unimportant" category. This has been a contributing factor to the current lack of ECCM readiness in the surface Navy.

Another significant contribution to the deficiencies in ECCM readiness is that the radar operator cannot develop his ECCM skills on a continuing basis at his duty station. Activation of ECCM circuits on a radar system in a nonECM environment will, for the majority of ECCM techniques, degrade the performance of the radar and will provide no indication to the operator that the circuit is functioning properly. In the normal (peacetime) operating environment, the radar operator of ECCM-capable equipment will not encounter ECM, unless it is during an EW exercise. Because of the previously cited low visibility of ECCM as an important operational and training concern and the fact that radar operators cannot use ECCM techniques without degrading the radar system performance, surface ECCM operator training is given only token consideration.

SURFACE NAVY RADAR OPERATOR ECCM TASKS

An analysis of radar operator ECCM tasks was performed at a level that allowed decisions to be made about where ECCM training would be beneficial and what training to provide. Additionally, this determination provided the needed criteria for analyzing existing ECCM training.

Thorough analyses demonstrated that the radar operator must:

- know the types and characteristics of anticipated ECM
- detect and identify ECM via the radar system
- know the effect of ECM techniques on radar system performance
- know ECCM options, in levels of effectiveness order, for countering detected ECM
- know the ECCM capabilities and limitations of the radar system(s) assigned
- locate and activate ECCM techniques associated with the radar system(s)
- where applicable, control/adjust activated ECCM techniques that can be varied to optimize radar data fidelity
- know the current ECCM tactical doctrine.

There are certain other major considerations that must be accounted for in structuring an effective ECCM training system. These are:

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- The skills and knowledges associated with ECCM tasks, like most other kinds of skills and knowledges, are highly perishable; i.e., they are quickly lost if not frequently used. The normal operational environment does not provide an opportunity to maintain acquired skills and knowledges. Currently, no method of determining the existing competency levels exists.
- Common core training can be provided in the different types of ECM, their characteristics, and general Navy tactical doctrine at the FT and OS "A" schools. The other ECCM subject matter is so interrelated to specific radar equipment characteristics that equipment specific "C" schools or the operational settings are the preferred training locations.
- High fidelity training; i.e., training providing representations of real world ECM/ECCM mission scenarios or specific signal/equipment characteristics, is required.

NAVY ECCM POLICIES AND PROCEDURES. While there are widely disseminated instructions, policies, and procedures pertaining to such issues as the importance and necessity of ECCM, reporting procedures, and techniques of EW, it was found that little or no effective direction is given to materially improving the fleet's ECCM posture/readiness.

At the fleet level, the direction, plans of action, and methods of proceeding in the ECM/ESM aspects of EW training (i.e., non-ECCM) are generally also well delineated. On the other hand, plans of action, methods, and procedures to effectively implement surface Navy ECCM training do not exist in ways which significantly improve the fleet ECCM readiness. It was found that the training community must be constantly in the position of "selling" its ECCM training to the fleet users.

SURFACE NAVY ECCM RELATED TRAINING PIPELINE--CNET SCHOOLS

OPERATIONS SPECIALIST SCHOOLS. An analysis of the Operations Specialist (OS) "A" school curriculum reveals that operating a radar scope is only one of many jobs OS personnel are trained to perform.

The "A" school course presents approximately 15 major topics, each with about 1 week (30 instructional hours) of instruction. The ultimate job of the OS is extremely diversified.

Radar scope operation must be considered among the most important of any of the OS tasks. Effective use of any ship's weapon system depends primarily on radar. In spite of this, the radar scope interpretation tasks receive the least amount of training time, approximately 12 hours, of which less than 2 hours are devoted to ECCM "chalk talk." ECCM training at the "A" school level can only be considered a token effort.

FIRE CONTROL TECHNICIAN (FT) SCHOOLS. ECCM training is not mentioned in the CNET's schools catalog as being FT "A" or "C" school subject matter--neither is operator training, per se. The Naval Technical Training Command's Training Program Coordinator (TPC) for FT training stated that the FT rating "A"/"C"

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school curricula contained essentially no ECCM training. Discussions with FT personnel during the course of the study confirmed the nonexistence of ECCM training in the formal schools.

FLEET LEVEL ECCM SCHOOLS

The study of fleet level ECCM schools identified only one "dedicated" ECCM course entitled "Electronic Countermeasures (ECM) Electronic Counter-Countermeasures (ECCM) Operations" being taught at the fleet level. Commander Training Command, Atlantic (COMTRALANT) is "model manager" for the course curriculum. TAEG personnel examined the East and West Coast course material, discussed the course with school instructor personnel, and attended the course at Fleet Training Center (FTC), Mayport, Florida, and the Fleet Combat Direction Systems Training Center (FCDSTC), San Diego, California.

OBSERVATIONS ON FLEET LEVEL ECCM TRAINING. The following observations are relevant to the ECCM course:

- inadequate time allocated for effective ECCM training
- too much "chalk talk" (instructor drawing on the chalkboard the "appearance" of different types of ECM)
- poor rationale (in some cases) used in selecting personnel to attend the course. (For example, one ship, whose CIC team was attending, was going into drydock for repairs for 12 months!)
- primarily theoretical courses with little or no practical training provided
- attendance at the courses is usually low--so low, in fact, that the one taught in San Diego is being considered for elimination.

ECCM TRAINING DEVICES

A survey of training devices supporting EW was performed to identify those devices supporting surface Navy ECCM training and their capabilities and application. From an accounting of funds expended on EW training devices from 1950 to 1970, it was determined that an almost insignificant percentage was spent on ECCM training hardware (\$374K out of \$60.141M). Only four devices were developed with a capability to provide surface Navy ECCM training: the 15E13/15E28, 15E15, AN/SPH-1 Radar Video Recorder (RAVIR), and AN/MPQ-T1 Pierside EW trainer.

The 15E13/15E28 training device is a hybrid simulator that is an integral part of the Tactical Advanced Combat Direction and Electronic Warfare (TACDEW) training complexes of the two FCDSTCs. Multiple ships' Combat Information Center (CIC) mockups are stimulated by the training device. ECCM training is provided in the TACDEW complex as a subelement of a typical CIC problem scenario.

Device 15E15 is a target and ECM generation device that stimulates an operational radar system by injecting its signals at the Intermediate Frequency

(IF) level. The device is transportable and readily interfaced to stimulate one radar system at a time. The 15E15 is compatible with the AN/SPS 5, 6, 10, 29, 30, 37, 40, and 43A surface search radar systems.

The RAVIR device provides essentially indoctrination training for surface search radar operators. Radar video data, recorded either during live ECM/ECCM exercises or from synthetic ECM/ECCM video generators, is "played back" on surface search radar Planned Position Indicators (PPIs) to allow trainees, radar operators, and CIC personnel to "see" the effects of ECM and ECCM.

The AN/MPQ-T1 Pierside Combat Systems Trainers were designed to provide the capability of stimulating multiple sensors aboard surface ships. An integrated ASMD and AAW problem can be simulated using the AN/MPQ-T1 trainer.

The survey of training devices also identified a procurement program underway that will produce additional Pierside Trainers, the Mobile Integrated Systems Trainer, Evaluator and Recorder (MISTER). Current plans call for delivery of 11 MISTER systems including the prototype.

It was found that each of the four available ECCM training devices has some deficiency. Common complaints by instructors and students were:

- "The RAVIR does not allow operator interaction in the training exercise."
- "Good quality video tapes of ECM/ECCM exercises for RAVIR training are hard to get."
- "The 15E15's are available in limited quantities and are not compatible with newer sophisticated radar systems."
- "The TACDEW ECM/ECCM capability is in a 'down' condition most of the time, or operates marginally, thus providing unrealistic training."
- "It is difficult at times to provide AN/MPQ-T1 training because of the extended times both ships personnel and equipment are tied up when utilizing the trainer."

From the same data sources was voiced a more overriding concern--a lack of utilization of available assets.

ECCM TRAINING AIDS

The training aids used by the surface Navy ECCM courses identified during the study fall into two categories: publications and audio/visual programs. The Surface Missile System (SMS)-TG-670 series documents, Radar Operation in Electronic Countermeasures, provide both general and equipment-specific information on ECCM operations for both search and fire control radar systems on SMS equipped ships. In addition, the Bureau of Naval Personnel document NAVPERS 92440C-5, ECCM Operators Guide, provides equipment-specific ECCM data principally on selected air and surface search radar systems.

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The NAVPERS 92440C-5 document, while considered basically a "good" document by personnel familiar with it, has a shortcoming. The document has not been updated since originally issued (1967/68). Consequently, data relevant to new radar developments and improvements to older radar systems introduced into the fleet since publication of NAVPERS 92440C-5 are not contained in the document.

The SMS series of documents was found to be widely distributed but little used. They are considered excellent source material. The level of technical detail contained in the documents is most appropriate for the FT personnel who have both operator and maintenance responsibilities. The OS personnel will probably have difficulty with the more technical portions of the documents due to their lack of in-depth training in radar systems theory.

The Naval Ship Missile Systems Engineering Station (NSMSES) Catalogue of Synchronized Sound/Slide Programs, dated March 1974, provides a detailed listing of 53 audio/visual ECCM training programs that were originally developed by the Educational Training Support Detachment, San Francisco, and which are currently maintained and distributed by NSMSES. TAEG analyzed the programs with keen interest. Apparently, these programs are the only such training materials found that were developed specifically for surface Navy radar operator ECCM training.

Analysis of the audio/visual programs reveals that overall they are an excellent set of training aids though some deficiencies exist within individual programs. The majority of the deficiencies are considered minor and do not materially detract from their usefulness as a valuable ECCM training aid. The programs were originally produced in the 1966 to 1970 time frame. Updating of the program series, including the changes made to surface Navy radar systems ECCM capabilities and configurations, and eliminating the short (5 minute) 16mm film strips would remove the major deficiencies in the program material.

FLEET TRAINING EXERCISES

The most significant onboard CIC EW operations/readiness checks and EW training exercises are conducted through the services of FEWSG. Twenty-four AAW exercise reports from ships receiving FEWSG services during the period January to October 1974 were analyzed.

The lack of continuity in data and reporting format, from ship to ship, made it virtually impossible to do a meaningful ECM/ECCM statistical analysis of ECCM training exercises. Where mission action/reaction event data did correlate well, operator ECM/ECCM performance (actions taken) was marginal in the majority of the reports. ECCM technique employment appeared to occur on a trial and error basis.

Approximately 40 percent of the ships' reports sampled stated that the FEWSG exercises provided first time EW environment exposure. The 1974 FEWSG exercise reports continue to substantiate surface Navy ECCM operational readiness deficiencies highlighted in FEWSG correspondence in 1972 and in the present report.

COMPARISON OF SURFACE NAVY AND AIR FORCE ECCM TRAINING

Air Force course 30LR17410/3ALR27631, Weapons Controller (ECCM) Operations Officer/Electronic Warfare Countermeasures Specialists, is a close parallel to the COMTRALANT ECCM course previously discussed in this report. A most apparent variance between the two courses is that, while both have similar purposes and course subject matter, there is a 10 to 1 ratio in the course lengths. The Air Force course requires 10 weeks to complete whereas 1 week is allocated for completion of the Navy course. The following additional comparisons were made:

- Air Training Command training aids were standardized; the Navy's were not.
- Training devices and/or operational equipment were dedicated to the Air Force course; the Navy's were not.
- The Navy did not uniformly use available assets.
- Air Force ECCM training continues at duty station on a daily basis via integrated stimulation/simulation equipments; the Navy's does not.

CONCLUSIONS

ECCM IN THE SURFACE NAVY. The low visibility of ECCM in the surface Navy is a significant contributor to the overall ECCM readiness problem. ECCM awareness must be substantially improved before fleet readiness can improve materially. The mechanism(s) for improving the image of ECCM must have impact on all personnel possessing responsibility as ECCM operators and/or decision makers on the weapons platforms as well as personnel at higher command levels. This is required, so that once obtained, ECCM readiness can then remain an effective Fleet asset.

Producing newer, more sophisticated ECCM capable surface radar systems to counter the growing ECM threat by itself is no answer to overcoming the lack of ECCM readiness. The inability to properly utilize current assets is testimony to this fact.

SURFACE NAVY RADAR OPERATOR ECCM TRAINING. The study findings indicate that there is essentially no viable ECCM training program in the surface Navy today. The training that is provided can be classified as indoctrination given sporadically to personnel selected by some obscure prioritization process to attend training courses.

ECCM skills and knowledges have been found to be closely dependent on the design characteristics of specific equipments. Therefore, providing extensive ECM/ECCM training in an "A" school environment is not considered desirable. At this level of training, the students' ECCM needs are best served by instruction in basic ECCM techniques and basic Naval doctrine for ECCM operations. The most appropriate place to provide a well prepared, in-depth ECM/ECCM operator training course, in the formal schools, is at the fleet/"C" school (equipment specific) level. This training should be designed to provide extensive "hands on" ECM versus ECCM practice sessions. The formal school training should be supported by a comprehensive onboard ECM/ECCM training capability for combatant ships.

Integration of the training of radar operators into CIC team training exercises involving ECM/ECCM environments should not take place until the trainee/operator has shown adequate proficiency in his individual tasks.

Integrated weapons systems trainers; e.g., MPQ-T1 pierside trainer, MISTER, and FEWSG assets, will provide the most cost-effective training when the weapon systems' team members, including the ECCM operators, are competent individual job performers.

The individual ECCM training aids and devices, while inadequate in numbers and/or capabilities, have attributes required to fulfill many of the ECCM training needs at various levels; i.e., formal schools, onboard team training. They are not currently being utilized effectively due to a multitude of reasons attributed to the lack of a cohesive ECCM training system.

NAVY ECCM POLICIES AND PROCEDURES. One of the initiating factors of the TAEG analysis of surface Navy ECCM training was an estimate by the Naval Material Command that 45 percent of the ECCM deficiencies were training related. The study findings contained in the present report strongly support the CHNAVMAT position and it is suspected that the percentage might prove to be higher if other nontraining areas contributing to ECCM deficiencies were more thoroughly examined. The findings of this present study also show that the ECCM training problem is not limited to the Naval Education and Training Command per se, but is rather a Navy problem. The TAEG analysis has found that when and where the training community performs its "service" function by providing ECCM training, it finds itself in the position of a salesman offering a product to a disinterested buyer.

Current policies with respect to ECCM readiness appear to allow this situation to exist primarily because of what they do not say as opposed to what they do say. Giving the training community the responsibility but not the authority for insuring fleet readiness of ECCM operator personnel simply provides a convenient "scapegoat" when things do not go well. This is not to suggest that the training community should have carte blanche authority in training matters; however, major goals and procedures must be agreed upon between those responsible for providing training and those possessing the authority for insuring that training is needed, provided, and accomplished. In this context, resolution of the fleet's ECCM readiness problems will require a dedicated team effort between the training community, the operational forces, and the personnel in management positions at the OPNAV level. Development of a viable ECCM training system must begin with a mutual agreement upon a set of realizable goals followed by a plan of action, supported at all levels of command involved, to reach those goals.

It is pertinent to note that initiation of any additional studies for the purpose of understanding the "ECCM readiness problem" would serve no useful purpose. What has been discussed in this report in many respects is a reaffirmation of the characteristics of surface Navy ECCM readiness cited in documents dated as far back as 1962. The problem has always been there and it is not going to "go away" on its own unless firm, positive actions are initiated.

RECOMMENDATIONS

PRIMARY. Existing organizational structures within OPNAV cognizant of surface Navy ECCM readiness are not considered sufficiently responsive to the current ECCM readiness problem. Training deficiencies, among others, are a result. Accordingly, the primary recommendation of this study is that an OPNAV sponsored and supported ECCM training improvement program be initiated. This program must possess well delineated responsibility and authority with strict accountability for all participants. The program's major objectives should be to initially raise to acceptable standards the operational readiness of the surface Navy ECCM operator/decision-making personnel and to provide mechanisms for maintaining this readiness to required standards. It is further recommended that CNO request the assistance of the Naval Education and Training Command in formulation of this program.

The following near- and long-term recommendations are made for inclusion in that program, provided that they are initiated as a part of the total program and not separately or independently as a solution to the ECCM readiness program.

RECOMMENDED NEAR-TERM ACTIONS.

1. Initiate the task of precisely defining ECCM personnel performance objectives for the rates within the OS and FT ratings. General guidelines for consideration are:

a. OS and FT "A" school training concentrate on indoctrination in threat ECM techniques, their effect on the families of radar systems within the surface Navy, the ECCM capabilities of the U.S. Naval radar systems to counter ECM, and the characteristics of tactical doctrine employed during hostile ECM encounters.

b. Recognition, skill, and knowledge training should be oriented to the specific platform assigned/to be assigned. Fleet/"C" schools and/or onboard ships are considered the appropriate settings for this training.

ACTION: CNO

SUPPORT: CNET, NPRDC, NAVSEASYSKOM, FEWSG

2. Develop new or restructure existing curricula in accordance with defined personnel performance objectives. This includes programs for "A" schools, fleet/"C" schools, onboard training, and CIC team training.

ACTION: CNO/CNET

SUPPORT: CNTECHTRA, COMTRALANT/PAC, FEWSG

3. Distribute existing ECCM training assets; i.e., training devices and audio/visual programs, to locations designated to provide ECCM training. Distribution should be in accordance with the ability of training resources to support the training objectives established for the respective locations.

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This part of the program will probably require production of additional sets of existing audio/visual programs. In addition, a concentrated effort will have to be made to bring existing ECCM training devices to fully operational status and maintain them in that status.

ACTION: CNO

SUPPORT: CNET, CNET SUPPORT

4. The concept of transferring fleet level ECCM training to a CIC team training setting is not recommended. Personnel must be proficient in their individual tasks/jobs prior to effective participation in team exercises.

ACTION: CNO

SUPPORT: CINCLANT/PAC, COMTRALANT/PAC

5. To the extent feasible, FEWSG assets should be used primarily to provide training to ships possessing radar operator personnel who are graduates of the recommended ECCM training program. To the extent possible, FEWSG ECM/ECCM demonstrations should not be provided to untrained personnel. Cost effective/training effective utilization of assets must be made.

ACTION: CNO, FEWSG

SUPPORT: CINCLANT/PAC

6. Accountability must be incorporated into the proposed ECCM training program. Initially, there will probably not be adequate resources; e.g., training aids and devices, to support all of the ECCM training objectives. Therefore, an interim criterion-based personnel ECCM job/task certification program(s) should be implemented. Requirements for certification should be commensurate with realizable performance objectives.

ACTION: CNO

SUPPORT: CNET, CINCLANT/PAC

RECOMMENDED LONG-TERM ACTIONS.

1. Identify the ECCM training deficiencies existing after completing the near-term actions. It is considered likely that the major shortfall will be in the number and the capabilities of training devices. This will be particularly true for devices capable of providing equipment specific fleet/"C" school and/or onboard training.

ACTION: CNO, CNET

SUPPORT: CNET SUPPORT, CNTECHTRA, CINCLANT/PAC

2. Initiate programs to procure the required assets and/or make the training program adjustments to remedy deficiencies identified in recommendation 1 above. Onboard training equipments that stimulate the weapon platform's

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radar systems appear to be the most viable solution to raise the visibility of ECCM and to provide a mechanism for achieving and maintaining ECCM readiness. ECCM performance training cannot be effectively accomplished in the absence of appropriate ECM (actual or synthetic). In addition, skills associated with ECCM operations are highly perishable, thus requiring frequent use to maintain proficiency. An onboard, underway training capability is currently being developed and will provide training which will interface with and make more meaningful the FEWSG exercises. It is therefore strongly recommended that:

a. Onboard radar stimulation equipments for ECCM training be procured and permanently installed onboard surface combatants. Initial installation should be on the larger capital ships.

b. All new surface Navy AAW/ASMD radar systems should include an inherent capability to completely exercise the systems' ECCM capabilities in support of training and operational readiness. The state-of-the-art in electronics technology makes this integral system capability possible without significant increases in equipment size/weight. Providing the essentials for adequate training without "gold plating" can minimize cost per unit while maximizing fleet ECCM readiness. Training command technical expertise should be combined with material command expertise during the RDT&E phase of new surface radar systems to optimize the training capability features of the equipments.

ACTION: CNO

SUPPORT: CHNAVMAT, CNET

3. Expand the proposed interim ECCM job task certification system as training capability increases until an accountability system is fully instituted that will measure ECCM readiness and identify ships which are not combat ready.

ACTION: CNO

SUPPORT: CNET, CINCLANT/PAC

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APPENDIX B
NAVY FLEET ECCM COURSE DATA

TAEG Report No. 93

COURSE NUMBER:
J-2G-0325

DATE OF LAST CHANGE:
78/11/16

TITLE:
COMBAT INFORMATION CENTER OFFICER, INTERMEDIATE, MODULE II

LOCATION:
COMBATRACENPAC
COMBATRACENLANT

LENGTH:
19 days P, 16 days M

CLASS OF SCHOOL/COURSE:
C2

SKILL IDENTIFIER:
NOBC 9216

CONVENING INFORMATION:
LANT: 12 times a year; PAC: 7 times a year

PURPOSE:
To provide line officers with appropriate training which will permit early qualification as CICO on a service force/amphibious ship or as CICWO on a combatant vessel.

SCOPE:
Module II consists of lectures, training films, practical drills, and synthetic mock-up sessions including:

1. CIC functions in an ASW/AAW environment
2. ASW search and attack procedures, LAMPS, sonobuoys
3. Electronic Warfare: ESM, ECM/DECM, ECCM, EMCON, and EW reporting
4. Soviet ASCM threat: air, surface, and sub-surface
5. AAW communications and plotting
6. USN fighter and attack aircraft, air-to-air missiles, surface-to-air missiles, CAP/missile coordination procedures
7. AIC and ASAC
8. Operations Security, Training Requirements
9. Naval Gunfire Support

PREREQUISITES:
SECRET clearance required. Students must be graduates of course A-00-0118, Surface Warfare Basic, or J-2G-0322, Module I, or successfully complete a pretest. Personnel failing to obtain a passing grade on the pretest may be assigned to J-2G-0322, Module I, and the ultimate duty station and/or BUPERS will be so advised.

QUOTA CONTROL:
CO, FCTCL DNK; ACDU USN: COMTRAPAC; Others: See Volume I

PERSONNEL REPORT TO:
Commanding Officer, Fleet Combat Training Center, Atlantic, Dam Neck, Virginia Beach, VA 23461.
Commanding Officer, Fleet Combat Training Center, Pacific, San Diego, CA 92147.

TAEG Report No. 93

COURSE NUMBER:
K-221-0071

DATE OF LAST CHANGE:
79/07/17

TITLE:
COMBAT INFORMATION CENTER WATCH SUPERVISOR

LOCATION:
COMBATRACENPAC
FLETRAGRU WPAC

LENGTH:
19 days P, 14 days M

CLASS OF SCHOOL/COURSE:
C1

SKILL IDENTIFIER:
None

CONVENING INFORMATION:
Various

PURPOSE:
This course is designed for OS2 and OS3 personnel to prepare them for qualification as CIC Watch Supervisor.

SCOPE:
Course includes instruction in intermediate maneuvering board principles; DRT checkout; radar assisted piloting; basic tactics; line and circular formations and maneuvers; screens and basic screen maneuvers; basic principles of radar; radar detection and tracking techniques; ECCM techniques and fixes; ASW, AAW and NGFS procedures; passive tracking techniques; and amphibious operations. Emphasis is placed on practical application.

PREREQUISITES:
OS "A" School or equivalent, CONFIDENTIAL clearance is required.

QUOTA CONTROL:
ACDU USN: COMTRAPAC; Others: See Volume I

PERSONNEL REPORT TO:
Commanding Officer, Fleet Combat Training Center, Pacific,
San Diego, CA 92147.
COMFLETRAGRU WESTPAC, Bldg. A-20, FLEACTS, Yokosuka, Japan

SPECIAL INFORMATION:
Course is 10 days P&M at FLETRAGRU WESTPAC.
Quotas at FLETRAGRU WESTPAC may be obtained by telephoning Yokosuka 234-5164.

TAEG Report No. 93

COURSE NUMBER:
K-221-0083

DATE OF LAST CHANGE:
80/03/07

TITLE:
CIC SEARCH RADAR JAMMING, RECOGNITION AND COUNTERMEASURES

LOCATION:
FLECOMBATRACENPAC

LENGTH:
5 days P, 4 days M

CLASS OF SCHOOL/COURSE:
F1

SKILL IDENTIFIER:
None

CONVENING INFORMATION:
9 times a year

PURPOSE:

To provide an introduction to electronic countermeasures and the procedures used to counter various types of jamming. Additionally, the capabilities, limitations and potentials of specific radars will be studied to enhance their effectiveness when used in a combat/exercise environment.

SCOPE:

Course includes: principles of radar; principles of electronic countermeasures; AN/SPS-40 series radar ECCM features; AN/SPS-43 series radar ECCM features; AN/SPS-10 series radar ECCM features; AN/SPS-48 series radar ECCM features; ECM inter/intra-ship; and ECM-ECCM practical application (laboratory).

PREREQUISITES:

Officer and enlisted personnel, E4 and above, assigned duties as shipboard radar operators. SECRET clearance required.

QUOTA CONTROL:

ACDU USN: COMTRAPAC

PERSONNEL REPORT TO:

Commanding Officer, Fleet Combat Training Center, Pacific,
San Diego, CA 92147. See Volume I for details.

TAEG Report No. 93

COURSE NUMBER:
J-221-0303

DATE OF LAST CHANGE:
80/06/10

TITLE:
SEARCH RADAR OPERATORS JAMMING RECOGNITION AND COUNTERMEASURES

LOCATION:
FLECOMBATRACENLANT DNECK
FLETRACEN SDIEGO

LENGTH:
5 days P&M

CLASS OF SCHOOL/COURSE:
F1

SKILL IDENTIFIER:
None

PURPOSE:

This course is designed to prepare CIC/EW Supervisors, CIC/EW Officers, CIC/EW Watch Officers in the:

1. Determination of effective ECCM Policy/Procedures
2. The Utilization of ECCM/MIJI reporting.
3. Soviet ECM Threat.

SCOPE:

This course consists of lectures, training films and demonstrations encompassing:

1. Soviet Jamming Equipment/Capabilities.
2. Fundamentals of Jammers, Jamming Techniques and Tactics.
3. Techniques for effective use of ECCM.

PREREQUISITES:

SECRET clearance required. An advanced copy of clearances must be received by FLECOMBATRACENLANT DNK seven days before the class convening date. Officers should be graduates of CIC Officer's Course J-2G-0325 or Electronic Warfare Officer's Course J-2G-0210 or have six months CIC/EW experiences at sea. Enlisted students should be graduates of Search Radar ECCM Techniques J-221-0338 course, and have six months experience at sea. Enlisted students must be Operations Specialist, Electronic Warfare or Fire Control Technician Petty Officers E5 or above.

QUOTA CONTROL:
CO, FLECOMBATRACENLANT

PERSONNEL REPORT TO:

Commanding Officer, Fleet Combat Training Center, Atlantic, Dam Neck,
Virginia Beach, VA 23461
Commanding Officer, Fleet Training Center, San Diego, CA

TAEG Report No. 93

COURSE NUMBER:
J-221-0304

DATE OF LAST CHANGE:
80/04/02

TITLE:
SEARCH RADAR OPERATORS JAMMING RECOGNITION AND COUNTERMEASURES

LOCATION:
FLEMINEWARTRC CH

LENGTH:
5 days P&M

CLASS OF SCHOOL/COURSE:
F1

SKILL IDENTIFIER:
None

CONVENING INFORMATION:
6 times a year

MASL NUMBER:
P990640 CHAS

PURPOSE:

This course is designed to prepare CIC Supervisors, CIC Officers, CIC Watch Officers, and Junior Officers in the:

1. Recognition of the types of Radar Countermeasures.
2. The determination of effective ECM Countermeasures.
3. The use of ECM reports from the operators.

SCOPE:

This course consists of lectures, training films, demonstrations, and applications encompassing:

1. Fundamentals of jammers, jamming techniques and tactics.
2. Techniques for effective use of ECCM.
3. Mock-up demonstration of jamming and ECCM fix utilization.

PREREQUISITES:

SECRET Clearance required. Officers should be graduates of CIC Officers Course J-2G-0325 or have six months CIC experience at sea, standing watches in CIC. Enlisted students must be Operations Specialists Petty Officers E6 and above.

QUOTA CONTROL:
CO, FLEMINEWARTRC CH

PERSONNEL REPORT TO:

Commanding Officer, Fleet and Mine Warfare Training Center,
Charleston, SC 29408

TAEG Report Nr. 93

COURSE NUMBER:
J-221-0320

DATE OF LAST CHANGE:
75/02/18

COMMAND CODE:
II-B-3

TITLE:
SHIPBOARD INTEGRATED WPNS, CIC, EW, TRAINING COURSE

LOCATION:
Conducted by MISTRAULANT aboard each ship(s) in port or at sea.

LENGTH:
2 - 5 Days P&M, but determined by the training needs of the individual ship or ships.

CLASS OF SCHOOL/COURSE:
F1

SKILL IDENTIFIER:
None

CONVENING INFORMATION:
Quarterly DNK - Monthly Others

PURPOSE:
To provide shipboard instruction, guidance and evaluation of individual and team training in the areas of anti-ship missile defense, anti-air warfare, electronic warfare and missile weapons systems.

SCOPE:
This course utilizes the RAVIR 15E15 and 15E27 training devices to provide on station advanced training in the following areas:

1. Electronic recognition of threat emitters.
2. Directed search procedures for search and fire control radars, passive sensors, sonar and visual lookouts.
3. ECCM circuits and operating procedures for the ship's installed radar system.
4. Operational procedures for the coordination of the EW/CIC/WPNS direction system for defense against airborne and surface threats.
5. Detailed descriptions, characteristics and probable enemy tactics of the air, surface and submarine launched anti-ship capable missiles. Radar and fire control equipments.

Additional instruction is provided in the following areas:

1. The details of threat description and recognition.
2. The capabilities and limitations of the weapons and search radar systems installed in the ship.
3. The elements and concepts necessary for shipboard doctrine and procedures to counter the anti-ship capable missiles and anti-air warfare environments.
4. The fundamentals of electronic countermeasures and features incorporated in the ship's equipment to defeat the enemy activity. The ship elects either the full course of instruction or the specific area of interest depending on the number of training days available.

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J-221-0320 (continued)

PREREQUISITES:

SECRET clearance is required. An advance copy of clearances must be received by FLECOMBATRACENLANT DNK seven days before the class convening date. Students must be Operations Specialist Petty Officers, E5 and below, designated strikers, or Class "A" School graduates. Class "A" School graduates and designated strikers must have six months at sea experience standing watches in CIC.

QUOTA CONTROL:

CO, FLECOMBATRACENLANT

PERSONNEL REPORT TO:

Commanding Officer, Fleet Combat Training Center, Atlantic, Dam Neck,
Virginia Beach, VA 23461

TAEG Report No. 93

COURSE NUMBER:
J-221-0338

DATE OF LAST CHANGE:
79/10/16

COMMAND CODE:
II-B-3

CONVENING INFORMATION:
11 times a year

TITLE:
CIC AIR SEARCH RADAR OPERATIONS, JAMMING RECOGNITION

LOCATION:
FLECOMBATRACENLANT

LENGTH:
12 days P, 10 days M

CLASS OF SCHOOL/COURSE:
F1

SKILL IDENTIFIER:
None

PURPOSE:

This course is designed to prepare Radar Operators, E5 and below, to function effectively in a Jamming, ECM environment. Subject areas covered are:

1. Recognition of normal radar operation.
2. Weather induced degradation of radar.
3. Types of radar countermeasures.
4. Determining effective ECM countermeasures.
5. Proper ECM reports to supervisor.
6. Modes of and proper operation of UPA-59 IFF Decoder Units including self-test procedures.

SCOPE:

This course consists of lectures, training films, demonstrations, and practical application encompassing:

1. Fundamentals of Air Search Radar, including RSC controls and ECCM available.
2. Operation of MK 12 IFF decoding equipment, UPA-59.
3. Fundamentals of jammers, jamming techniques, and tactics.
4. Techniques for effective use of ECCM.
5. Mock-up demonstrations of jamming and countermeasures, and practical use of IFF decoding equipment.

PREREQUISITES:

SECRET clearance is required. An advance copy of clearances must be received by FLECOMBATRACENLANT DNK seven days before the class convening date. Students must be Operations Specialist Petty Officers, E5 and below, designated strikers, or Class "A" School graduates. Class "A" School graduates and designated strikers must have six months at sea experience standing watches in CIC.

QUOTA CONTROL:
CO, FLECOMBATRACENLANT

PERSONNEL REPORT TO:
Commanding Officer, Fleet Combat Training Center, Atlantic, Dam Neck
Virginia Beach, VA 23461

SPECIAL INFORMATION:
This course supersedes CIN J-2G/221-305X.

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COURSE NUMBER:
J-233-0202

DATE OF LAST CHANGE:
78/12/18

COMMAND CODE:
II-B-3

CONVENING INFORMATION:
Monthly; 6 times a year
at PEARL & MAYPORT

TITLE:
ELECTRONIC WARFARE OPERATOR COURSE, INTERMEDIATE

LOCATION:
FLETRACEN NORFK
FLETRAGRU PEARL
FLETRACEN MAYPORT
FLEMINWARTRC CH

LENGTH:
5 days P&M

CLASS OF SCHOOL/COURSE:
F1

SKILL IDENTIFIER:
None

PURPOSE:

To train personnel in the EW language, the usage of Electronic Warfare publications and instructions, ELINT Procedures, ECCM recognition and analyzation, and the reporting procedures used throughout the field of Electronic Warfare.

SCOPE:

This course consists of classroom instruction, laboratory demonstrations and practical exercises in:

- a. Concept of electronic warfare.
 - b. ELINT procedures.
 - c. Publications, instructions and EW Pro-words.
 - d. Internal communications and external communications.
 - e. National and NATO procedures.
 - f. ZIPPO/ASMD procedures.
 - g. ECM recognition and ECCM recommendations.
 - h. AN/WLR-1 and AN/UNQ-7 equipment and reporting procedures.
- Upon completion of this course, the trainee will have the necessary knowledge and basic skill to enable him to operate the AN/WLR-1 and AN/UNQ-7 to make ELINT recording, utilize correct reporting procedures, recognize and analyze ECM signals and make correct ECCM recommendations as set forth in pertinent publications and instructions.

PREREQUISITES:

SECRET clearance required; three months working in the EW field and successful completion of course J-233-0201 or six months working in the field of EW.

QUOTA CONTROL:

FLETRACEN NORFK; FLETRAGRU PEARL; FLETRACEN MAYPORT; FLEMINWARTRC, CH, SC, AUTOVON 794-6311 or COMMERCIAL 743-6311

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APPENDIX C

FLEET ELECTRONIC WARFARE SUPPORT GROUP
EXERCISE REPORTS

This appendix presents a listing of the FEWSG Exercise Reports examined by TAEG. The reports cover the period 1975 to 1980 and are listed in alphabetical order.

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FEWSG EXERCISE REPORTS (1975-1976)

AIRTEVRON FOUR MSG 021812Z Sep 76 (U) (SECRET)

CO USS AMERICA (CV-66) ltr ser C-004 of 15 Jun 76, EW Jamming; Post-exercise Report (U) (CONFIDENTIAL)

CO USS BARBEY (FF-1088) ltr ser C-1 of 21 Jan 76, Post Exercise Data Report (U) (CONFIDENTIAL)

CO USS BIDDLE (CG-34) ltr ser C6-76 of 1 Jul 76, ECM Demonstration; Report of (U) (CONFIDENTIAL)

CCAEEW-12 ltr ser S4 of 16 Nov 76, Submission of EW Jamming Operational Report - SMOKED GLASS 1-76 (U) (SECRET)

CG FIRST MAR BDE KANEOHE BAY HI MSG 050335Z May 76, Jamming Effectiveness Report (U) (CONFIDENTIAL)

CO USS CLEVELAND (LPD-7) ltr of 12 May 76, EW Jamming Exercise Data; Forwarding of (U) (CONFIDENTIAL)

CTG 200.8 MSG 221326Z Jul 76, EW Jamming Operational Report (U) (CONFIDENTIAL)

USS DAHLGREN (DDG-43) ltr ser C28/76 of 11 Aug 76, FEWSG Demonstration; Report of (U) (CONFIDENTIAL)

CO USS DENVER ltr ser 626 of 29 Dec 75, EW Jamming Report; Forwarding of (U) (CONFIDENTIAL)

CO USS ENGLAND (CG-22) ltr ser C25 of 28 Dec 76, Exercise Data (U)(CONFIDENTIAL)

FITRON 24 MSG 242300Z FEB 76, ECCM OPREP for 12 thru 21 Jan 76 (U) (CONFIDENTIAL)

FITRON 211 MSG 060141Z FEB 76, ECCM OPREP for 19 thru 21 Jan 76 (U) (CONFIDENTIAL)

FITRON 211 MSG 132324Z Sep 76, Squadron ECM Exercise Report (U) (CONFIDENTIAL)

CO USS FORRESTAL (CV-59) ltr ser 56 of 19 May 76, Electronic Warfare Jamming Reports (U) (SECRET)

HMCS GATINEAW (Canada) ltr DGU 3550-1 of 4 Nov 76, EW Demonstration Report (U) (CONFIDENTIAL)

CO USS HEWITT (DD-966) ltr ser C-118 of 22 Dec 76, Exercise Data (U) (CONFIDENTIAL)

CO USS HOEL (DDG-13) ltr ser C-3 of 2 Apr 76, (No subject line in ltr) (U) (CONFIDENTIAL)

CO USS AGER HOLM (DD-825) ltr ser:001 of 27 Feb 76, JAMEX Post Exercise Report (U) (CONFIDENTIAL)

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FEWSG EXERCISE REPORTS (1975-1976)(continued)

- CO USS INDEPENDENCE (CV-62) 1tr ser 25 of 17 Nov 76, Post-Exercise Reports for FEWSG Services (U) (SECRET)
- CO USS JOVETT (CG-29) 1tr ser C137 of 26 Apr 76, EW Jamming Operational Report (U) (CONFIDENTIAL)
- CO USS J. F. KENNEDY (CV-67) 1tr ser C39 of 17 Jul 76, EW Jamming Operational (U) (CONFIDENTIAL)
- CO USS J. F. KENNEDY (CV-67) 1tr ser C48 of 20 Aug 76, EW Jamming Operational Report (U) (CONFIDENTIAL)
- CO USS KIRK (DE-1087) 1tr ser C6 of 26 Jan 76, ERA-3B Jamming Demo of 15 Jan 76 (U) (CONFIDENTIAL)
- CO USS KIRK (DE-1087) 1tr ser C26 of 3 Jun 76, ERA-3B Jamming Demo of 26 May 76 (U) (CONFIDENTIAL)
- HMCS KOOTENAY 1tr DKY 3350-1 of 27 Oct 76, EW Event 1709-READIEX 1-77 (U) (CONFIDENTIAL)
- CO USS LANG (FF-1060) 1tr ser:S-171-75 of 31 Dec 75, Jamming Exercise; Report of (U) (SECRET)
- MCAS SEVEN CAMP PENDLETON CA MSG 060209Z Apr 76, EW Jamming Operational Report (U) (CONFIDENTIAL)
- MCAS SEVEN CAMP PENDLETON CA MSG 292348Z Nov 76, EW Training Operational Report (U) (CONFIDENTIAL)
- CO USS MEYERKORD (FF-1058) 1tr ser 106 of 18 Apr 76, Exercise Data, Standard EW Demonstration Number One (U) (CONFIDENTIAL)
- USCG MIDGETT (WHEC-726) 1tr C011-76 of 4 Feb 76, Electronic Warfare Jamming Operational Report (U) (CONFIDENTIAL)
- CO USS NIMITZ (CVN-67) 1tr ser C75 of 11 Jun 76, Exercise Reports (U) (CONFIDENTIAL)
- CO USS O'CALLAHAN (FF-1051) 1tr ser 06 of 27 Jan 76, Jamming Demonstration; Comments on (U) (CONFIDENTIAL)
- CO USS O'CALLAHAN (FF-1051) 1tr ser C24 of 24 Dec 75, Jamming Demonstration; Comments on (U) (CONFIDENTIAL)
- CO USS RANGER (CV-61) 1tr ser C10 of 11 Feb 76, Electronic Warfare JAMEX Report (U) (CONFIDENTIAL)
- CO USS SARATOGA MSG 271435Z Jul 76, Post-EX Events 2602, 2620 (U) (CONFIDENTIAL)

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FEWSG EXERCISE REPORTS (1975-1976)(continued)

CO USS SARATOGA (CV-60) ltr ser 03/539-76 of 9 Aug 76, Jamming Demonstration
(U) (SECRET)

CO USS SELLERS (DDG-11) ltr ser C-18 of 11 Sep 76, Post Exercise Report for
FEWSG Demonstration of 26 Jul 76 (U) (CONFIDENTIAL)

CO USS STERETT (CG-31) Speed ltr ser C16 of 22 Dec 76, EW Jamming Operational
Report (U) (CONFIDENTIAL)

CO USS TOWERS (DDG-9) ltr ser C5 of 14 Jan 76, ERA-3B Jamming Demonstration
of 10 Dec 75 (U) (CONFIDENTIAL)

VAW-112 ltr ser C1 of 5 Jan 76, EW Jamming Operational Report; Submission of
(U) (CONFIDENTIAL)

VAW-113 Speed ltr ser 01 of 23 Jan 76, EW Exercise (U) (CONFIDENTIAL)

VAW-114 ltr ser C08 of 11 June 76, EW Jamming Operational Report (U) (CONFIDENTIAL)

VAW-133 Speed ltr ser 122 of 16 Jun 76, EW Exercise (U) (CONFIDENTIAL)

CO USS VESOLE (DP-818) ltr ser C-007-76 of 9 Aug 76, EW Jamming Operational
Report (U) (CONFIDENTIAL)

VF-51 ltr ser 01 of 8 Jan 76, Exercise Data Report; Forwarding of (U) (CONFIDENTIAL)

VF-51 ser C03 of 6 Feb 76, Exercise Data Report; Forwarding of (U) (CONFIDENTIAL)

VF-51 ltr ser C5 of 8 Apr 76, Exercise Data Report; Forwarding of (U)
(CONFIDENTIAL)

VF-51 ltr ser C6 of 14 Jun 76, Exercise Data Report; Forwarding of (U)
(CONFIDENTIAL)

VF-101 ltr ser C-19 of 22 Nov 76, Electronic Warfare Jamming Operational Report
(U) (CONFIDENTIAL)

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FEWSG EXERCISE REPORTS (1977)

CO USS AGERHORN (DD-826) ltr ser C-1 of 6 Feb 77, EW Jamming Demonstration;
Comments on (U) (CONFIDENTIAL)

CO USS BIDDLE (CG-34) ltr ser 129 of 25 Feb 77, ECM Demonstration; Report of
(U) (CONFIDENTIAL)

CO USS BIDDLE (CG-34) ltr ser 339 of 9 Jun 77, ECM Demonstration; Report of
(U) (CONFIDENTIAL)

USS BYRD MSG 190235Z Apr 77, COMPTWEX 4-77 Post-Exercise Report Event 1813
(EW DEMO) (U) (CONFIDENTIAL)

CO CARRIER AIRBORNE EARLY WARNING SQUADRON EIGHTY EIGHT (VAW-88) ltr ser
005 of 28 Dec 77, EW Jamming Report (U) (SECRET)

CG First Marine Brigade ltr 3120 of 30 Mar 77, ECM Effectiveness Report(s) (U)
(CONFIDENTIAL)

CG Third Marine Air Wing FMFPAC ltr 3430 of 14 Apr 77, Electronic Countermeasures
Report (U) (CONFIDENTIAL)

COMCARGRU FOUR ltr ser C3 of 7 Nov 77, USS NIMITZ (CVN-67)
ORE EW Data (U) (SECRET)

COMPATWING FIVE MSG 081913Z Apr 77, PATWING FIVE EW WEEK (U) (CONFIDENTIAL)

COMPHIBRON FIVE ltr ser N3/C50 of 21 Sep 77, Post-Exercise Report, FEWSG EW
Demo of 13 Sep 77 (U) (CONFIDENTIAL)

CO USS CRAIG (DD-885) ltr ser 004 of 3 Jan 77, EW Jamming Operational Report
(U) (CONFIDENTIAL)

CO USS ENGLAND (CG-22) ltr ser C14 of 30 Mar 77, EWEX 16 Mar 77 (Small);
Forwarding of (U) (CONFIDENTIAL)

CO USS ENGLAND (CG-22) ltr ser C27 of 15 Jul 77, Exercise Data (U) (CONFIDENTIAL)

CO USS ENTERPRISE (CVN-65) ltr ser 03/C150 of 28 Oct 77, EW Training Demon-
stration Report (U) (CONFIDENTIAL)

CO USS GRIDLEY (CG-21) ltr ser S-1 of 13 Jan 77, EW Jamming Operational Report
(U) (CONFIDENTIAL)

CO USS GRIDLEY (CG-21) ltr ser S-2 of 1 Apr 77, EW Jamming Operational Reports
(U) (SECRET)

CO USS JOUETT (CG-29) ltr ser C7 of 15 Apr 77, Exercise Data (U) (CONFIDENTIAL)

CO USS KITTY HAWK (CV-63) ltr ser 31/514 of 4 Oct 77, EW Jamming Report (U)
(CONFIDENTIAL)

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FEWSG EXERCISE REPORTS (1977)

CO USS LEAHY (CG-16) ltr ser C6-77 of 27 Oct 77, Consolidated FEWSG Post-Exercise Report (U) (CONFIDENTIAL)

CO USS LONG BEACH ltr ser C49 of 5 Jul 77, EW Jamming Operational Report (U) (CONFIDENTIAL)

CO USS LONG BEACH ltr ser 1060 of 22 Dec 77, EW Jamming Operational Report (U) (CONFIDENTIAL)

MAC SEVEN MSG 060041Z Jan 77, EW Training Operational Report (U) (CONFIDENTIAL)

MAC SEVEN MSG 300002Z Mar 77, EW Training Operational Report (U) (CONFIDENTIAL)

MAC SEVEN MSG 282303Z Apr 77, EW Jamming Effectiveness Report (U) (CONFIDENTIAL)

MAG TWENTY FOUR MSG 010249Z Apr 77, EW Jamming Operational Report (U) (CONFIDENTIAL)

CO USS MEYERKORD (FF-1058) ltr ser 40 of 9 Feb 77, Exercise Data, Standard EW Demonstration Number Two (U) (CONFIDENTIAL)

CO USS MILLER (FF-1091) ltr ser C7 of 2 Nov 77, Exercise Data (U) (CONFIDENTIAL)

CO USS NIMITZ (CVN-68) ltr ser C92 of 25 Oct 77, Exercise Data (U) (CONFIDENTIAL)

USS OGDEN MSG 270654Z MAR 77, Post-Exercise Report (U) (CONFIDENTIAL)

CO USS PEORIA (LST-1183) ltr ser C3-77 of 8 Apr 77, EW Jamming Operational Report (U) (CONFIDENTIAL)

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